

Alesis D4 Midi Implementation

April 3, 1992

Software Version 1.04



TRANSMITTED DATA

Channel Messages

Status	Second	Third	Description
1001 nnnn	0kkk kkkk	0vvv vvvv	Note On kkk kkkk = 0-127 (61 Key Window + Root Note) vvv vvvv = 1-127 vvv vvvv = 0 = Note Off

Universal System Exclusive Messages
(Transmitted on power up and when Inquiry Request is received)

Byte	Description
1111 0000	Exclusive Status
0111 1110	Non-Real Time Message ID
0uuu uuuu	Universal Sysex Channel (Same as D4 Midi Channel)
0000 0110	General Information Sub-ID
0000 0010	Inquiry Message Identity Reply
0000 0000	Manufacturers System Exclusive ID Code
0000 0000	
0000 1110	Alesis = 00H,00H,0EH
0000 0110	Device Family Code LSB (D4 = 6)
0000 0000	Device Family Code MSB
0000 0000	Device Family Member LSB (D4 = 0)
0000 0000	Device Family Member MSB
0qqq qqqq	Software Version LSB
0qqq qqqq	Software Version MSB
0rrr rrrr	Software Revision LSB
0rrr rrrr	Software Revision MSB
1111 0111	EOX

D4 System Exclusive Messages

Byte	Description
1111 0000	Exclusive Status
0000 0000	Manufacturers System Exclusive ID Code
0000 0000	
0000 1110	Alesis = 00H,00H,0EH
0000 0110	Device ID (D4 = 6)
0000 nnnn	Midi Channel
00oo oooo	Opcode (see Sysex section for opcode definitions and data structures)

0ddd dddd Data

1111 0111 EOX

RECOGNIZED RECEIVE DATA

Channel Messages

Status	Second	Third	Description
1001 nnnn	0kkk kkkk	0vvv vvvv	Note On kkk kkkk = 0-127 (61 Key Window + Root Note) vvv vvvv = 1-127
1011 nnnn	0000 0110	0vvv vvvv	Data Entry MSB *1
1011 nnnn	0000 0111	0vvv vvvv	Volume *1
1011 nnnn	0110 0000	0xxx xxxx	Data Increment *1 xxx xxxx = Ignored
1011 nnnn	0110 0001	0xxx xxxx	Data Decrement *1 xxx xxxx = Ignored
1011 nnnn	0110 0010	0vvv vvvv	Non-Registered Parameter Number LSB *1
1011 nnnn	0110 0011	0vvv vvvv	Non-Registered Parameter Number MSB *1 (see Parameter section for specific values)
1011 nnnn	0110 0100	0vvv vvvv	Registered Parameter Number LSB *1
1011 nnnn	0110 0101	0vvv vvvv	Registered Parameter Number MSB *1 (see Parameter section for specific values)
1011 nnnn	0111 1001	0xxx xxxx	Reset All Controllers *1
1011 nnnn	0111 1010	0000 0000	Local Control Off
1011 nnnn	0111 1010	0111 1111	Local Control On
1011 nnnn	0111 1100	0xxx xxxx	Omni Mode Off
1011 nnnn	0111 1101	0xxx xxxx	Omni Mode On
1100 nnnn	0ppp pppp	---- ----	Program change
1110 nnnn	0mmm mmmm	0nnn nnnn	Pitch Bend Change *1

*1 Recognized only if CONTROLLERS is set to ON in MIDI page

Universal System Exclusive Messages

Byte	Description
1111 0000	Exclusive Status
0111 1110	Non-Real Time Message ID
0uuu uuuu	Universal Sysex Channel (ignored if OMNI = ON, 7FH = any channel)
0000 0110	General Information Sub-ID
0000 0001	Identity Request
1111 0111	EOX

D4 System Exclusive Messages

Byte	Description
1111 0000	Exclusive Status
0000 0000	Manufacturers System Exclusive ID Code
0000 0000	
0000 1110	Alesis = 00H,00H,0EH
0000 0110	Device I.D. (D4 = 6)
0uuu uuuu	Midi Channel 7FH = Any channel

0000 0000 Opcode (see Sysex section for opcode definitions and data structures)
 0ddd dddd Data

1111 0111 EOX

Byte Description

1111 0000 Exclusive Status
 0000 0000 Manufacturers System Exclusive ID Code
 0000 0000
 0000 1110 Alesis = 00H,00H,0EH
 0000 0110 Device I.D. (D4 = 6)
 0uuu uuuu Midi Channel 7FH = Any channel
 0100 0000 Data Request (see Sysex section for opcode definitions)
 1111 0111 EOX

RECOGNIZED CONTINUOUS CONTROLLER PARAMETERS

The most reliable way to edit a parameter using a registered or non-registered parameter number is to first transmit the parameter number MSB. In the D4 this is always zero, and it only needs to be sent once to initialize registered or non-registered parameter number reception. If both MSB and LSB messages have not been sent, any data entry, data increment, or data decrement messages will alter the parameter selected by the user as indicated by the cursor position in the display.

When a valid parameter number has been set up for editing, the display and cursor will be updated just as though the parameter had been selected from the front panel. (If an associated display exists!) Since it is possible for the user to select a new parameter for editing from the front panel between a series of data entry, data increment, or data decrement messages, it is strongly recommended that the parameter number LSB always be re-sent immediately before transmitting any of these controllers. This will insure that they are always acting on the intended parameter.

The actual 7 bit values for continuous controller messages 96 (data increment) and 97 (data decrement) are ignored. Likewise, continuous controller message 38 (data entry LSB) is ignored. To find the value of the 7 bit data entry MSB message (controller 6) to transmit in order to select a real-life setting, multiply the desired value by 127, and divide the result by the maximum allowable value for that parameter.

For example, the data entry MSB value used to set the Preview note's volume to 50 is 64 because:

$$50 \times 127 / 99 = 64$$

The data entry MSB value used to set the Drum set's Root Note's to 44 is 83 because:

$$44 \times 127 / 67 = 83$$

Registered Parameter Numbers for Controllers 100 (LSB) and 101 (MSB)

MSB	LSB	Description
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00H	00H	Pitch bend sensitivity. (maximum range = +/- 12 semitones)
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Non-Registered Parameter Numbers for Controllers 98 (LSB) and 99 (MSB)

Trigger Parameters:

MSB	LSB	Description	Range
00H	00H	Select active trigger.	0-11
00H	01H	Active trigger v-curve.	0-7
00H	02H	Active trigger note number.	0 to 60 + Root Note
00H	03H	Active trigger gain.	0-99
00H	04H	Active trigger cross-talk.	0-99
00H	05H	Active trigger decay.	0-99
00H	06H	Active trigger noise floor.	0-99
00H	07H	Ignored	

Preview note specific:

MSB	LSB	Description	Range
00H	08H	Preview note drum bank.	Kik, Snr, Cym, Tom, Prc, Efx
00H	09H	Preview note drum sound.	Bank dependant
00H	0AH	Preview note coarse tune.	-4 to +3 semitones
00H	0BH	Preview note fine tune.	0 to +99 cents
00H	0CH	Preview note volume.	0 to 99
00H	0DH	Preview note pan.	<3, <2, <1, <>, 1>, 2>, 3>
00H	0EH	Preview note output pair.	MAIN, AUX
00H	0FH	Preview note assign group.	MULTI, SINGLE, GROUP1, GROUP2

Midi parameters:

MSB	LSB	Description	Range
00H	10H	Drumset root note.	0-67
00H	11H	Midi channel.	1-16 Think about it!
00H	12H	Midi THRU.	OFF, ON
00H	13H	Program change enable.	OFF, ON
00H	14HH	Controller enable.	OFF, ignored if already off!
00H	15H	Program table source.	0 to 127
00H	16H	Program table destination.	0 to 20
00H	17H	Ignored.	

Miscellaneous:

MSB	LSB	Description	Range
00H	18H	Note Chase enable.	Off, On
00H	19H	Quietly select preview note.	0 to 60 + Root Note
00H	1AH	Flange Rate.	0 = fast, 127 = slow
00H	1BH	Footswitch mode.	Hi Hat Pedal, Drumset Advance
00H	1CH	Footswitch close note.	0 to 60 + Root Note
00H	1DH	Footswitch held note.	0 to 60 + Root Note
00H	1EH	= ignored.	
00H	1FH	= ignored.	

Drumset Management:

MSB	LSB	Description	Range
00H	20H	Drumset name char 1	16-127
00H	21H	Drumset name char 2	16-127
00H	22H	Drumset name char 3	16-127
00H	23H	Drumset name char 4	16-127
00H	24H	Drumset name char 5	16-127
00H	25H	Drumset name char 6	16-127
00H	26H	Drumset name char 7	16-127
00H	27H	Drumset name char 8	16-127
00H	28H	Drumset name char 9	16-127
00H	29H	Drumset name char 10	16-127
00H	2AH	Drumset name char 11	16-127
00H	2BH	Drumset name char 12	16-127
00H	2CH	Drumset name char 13	16-127
00H	2DH	Drumset name char 14	16-127
00H	2EH	Store Drumset destination	0-20
00H	2FH	Store Drumset	False / True
00H	30H	Recall Alesis Drumset srce.	0 to 20
00H	31H	Recall Alesis Drumset dest.	0 to 20
00H	32H	Recall all Alesis Drumsets.	False / True
00H	33H thru 7FH	= ignored.	

SYSTEM EXCLUSIVE OPCODES AND DATA STRUCTURES

General Format

All transmitted and received D4 system exclusive messages follow this template:

F0H,00H,00H,0EH,06H,cc,qq,DATA.....,F7H

If the message originated from the D4 the sixth byte "cc" will always be the same as the midi channel. If an originator wishes to send a system exclusive message to any D4 regardless of what midi channel is selected, "cc" should be set to 7FH. In addition, a D4 set to OMNI will process all system exclusive messages it receives.

The seventh byte "qq" is the opcode. If bit 6 of this opcode is set the message is a data request and the opcode is always followed immediately by an end-of-exclusive status byte. Opcodes with bit 6 cleared are data dump headers that identify the type of data that is to follow. In either case, the lower six bits of the opcode represent the same data structure, whether the message is a data request or a data dump.

Most system exclusive messages on the D4 include a checksum byte after the data immediately before the F7H end-of-exclusive status byte. This checksum is the modulo 128 addition of all the data bytes contained in the message starting with the byte immediately following the opcode.

Opcode	Description	Length <i>Total Bytes</i>	Checksum
0000 0000	System Info	11	No
0000 0001	Drumset Data for Edit Buffer	343	Yes
0000 0010	Old Trigger Setup (version 1.01 only)	33	Yes
0000 0011	Program Change Table	137	Yes
0000 0100	Display Message	40	No
0000 0101	New Trigger Setup	69	Yes
0000 0110	Reserved / Unused	x	x
.	.	x	x
.	.	x	x
0001 1111	Reserved / Unused	x	x
001p pppp	Drumset Data for Drumset 0-20	343	Yes
0011 0101	Reserved / Unused	x	x
.	.	x	x
.	.	x	x
0011 1111	Reserved / Unused	x	x
01qq qqqq	Requests for opcodes 0-63	8	No

When a "SYSTEM (ALL)" bulk dump is initiated from the front panel the D4's entire memory contents get transmitted out MIDI in a series of 25 system exclusive messages. This series begins with the Program Change Table message, and is followed by the Trigger Setup message, the Edit Buffer message, 21 consecutive Single Set messages (beginning with Drumset 0), and finally the System Info message.

Note that it is possible in some systems to overflow the D4's midi receive buffer when sending data for more than one drumset. If this happens the transmitting device should pause for at least 250 milliseconds every 256 bytes to insure that the receiving D4 has enough time to manage drumset memory.

Message 0 / System Info

Data Format (following header):

Byte	Bit Field	Description
7	0000 0000	Opcode = System Info
8	0bbb bbbb	System Byte (see specific bit definitions below)
9	0000 nnnn	Midi Channel (0-15)
10	000s ssss	Currently selected drumset (0-20)
11	1111 0111	EOX

System Byte Bit Definitions:

Bit	Function	Polarity
0	Omni Off	Set if omni mode is off.
1	Midi Thru Enable	Set if MIDI thru is enabled.
2	Program Change Enable	Set if program change receive is enabled.
3	Controllers Enable	Set if MIDI controllers are enabled.
4	Drumset Edited	Set if drumset in edit buffer has changed.
5	Footswitch Mode	0 = Hi Hat, 1 = Drumset Advance
6	Note Chase Enable	Set if Note Chase is on.

Message 1 / Edit Buffer

Data Format (following header):

Byte	Bit Field	Description
7	0000 0001	Opcode = Edit Buffer
8	0aaa aaaa	Drumset name character 1 (ascii)
9	0aaa aaaa	Drumset name character 2 (ascii)
.	.	.
21	0aaa aaaa	Drumset name character 14 (ascii)
22	0mmm mmmm	Drumset Root Note (0-67)
23	00nn nnnn	Footswitch "closing" note (0-60)
24	00nn nnnn	Footswitch "held" note (0-60)
25	00nn nnnn	Trigger 1 note number (0-60)
26	00nn nnnn	Trigger 2 note number (0-60)
.	.	.
36	00nn nnnn	Trigger 12 note number (0-60)
37-41	Data packet for note 0 (see below for packet definitions)
42-46	Data packet for note 1
.	.	.
337-341	Data packet for note 60
342	0xxx xxxx	Checksum (0-127)
343	1111 0111	EOX

Note Data Packet Definitions (5 bytes per note):

Byte	Bit Field	Description
0	0vvv vvvv	v = volume (0-99)
1	0ppp obbb	p = panning: 0=left, 3=center, 6=right o = output: 0=main, 1 = aux b = drum bank: (0-6) Kik, Snr, Cym, Tom, Prc, Efx
2	0nnn nnnn	n = drum number (0-99, drum bank specific)
3	0fff ffff	f = fine tuning (0-99 cents)
4	0xxg gccc	x = reserved, always 0 g = assign group (0-3): 0=multi, 1=single, 2=group 1, 3=group 2 c = coarse tuning (-4,+3 semitones)

Message 2 / Old Trigger Setup (version 1.01 only)

Data Format (following header):

Byte	Bit Field	Description
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7	0000 0010	Opcode = Trigger Setup
8	000t tttt	Trigger 1 gain (0-99)
9	000t tttt	Trigger 2 gain (0-99)
.	.	.
19	000t tttt	Trigger 12 gain (0-99)
20	000t tttt	Trigger 1 type (0-25)
21	000t tttt	Trigger 2 type (0-25)
.	.	.
31	000t tttt	Trigger 12 type (0-25)
32	0xxx xxxx	Checksum (0-127)
33	1111 0111	EOX

Message 3 / Program Table

Data Format (following header):

Byte	Bit Field	Description
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7	0000 0011	Opcode = Program table
8	000p pppp	Internal Drumset selected for external program change 0 (0-20)
9	000p pppp	Internal Drumset selected for external program change 1 (0-20)
.	.	.
135	000p pppp	Internal Drumset selected for external program change 127 (0-20)
136	0xxx xxxx	Checksum (0-127)
137	1111 0111	EOX

Message 4 / Display Message

This message will display 32 characters on the LCD for approximately 5 seconds and then restore the previous display.

Data Format (following header):

Byte	Bit Field	Description
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7	0000 0100	Opcode = Display Message
8	0aaa aaaa	LCD character position 0 (ascii)
9	0aaa aaaa	LCD character position 1 (ascii)
.	.	.
39	0aaa aaaa	LCD character position 31 (ascii)
40	1111 0111	EOX

Message 5 / New Trigger Setup (versions 1.02 and greater)

Data Format (following header):

Byte	Bit Field	Description
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7	0000 0101	Opcode = New Trigger Setup	
8	0ggg gggg	Trigger 1 gain	(0-99)
9	0ggg gggg	Trigger 2 gain	(0-99)
.	.	.	
18	0ggg gggg	Trigger 11 gain	(0-99)
19	0ggg gggg	Trigger 12 gain	(0-99)
20	0000 0ccc	Trigger 1 vcurve	(0-7)
21	0nnn nnnn	Trigger 1 cross-talk	(0-99)
22	0xxx xxxx	Trigger 1 noise floor	(0-99)
23	0ddd dddd	Trigger 1 decay	(0-99)
24	0000 0ccc	Trigger 2 vcurve	(0-7)
25	0nnn nnnn	Trigger 2 cross-talk	(0-99)
26	0xxx xxxx	Trigger 2 noise floor	(0-99)
27	0ddd dddd	Trigger 2 decay	(0-99)
.	.	.	
64	0000 0ccc	Trigger 12 vcurve	(0-7)
65	0nnn nnnn	Trigger 12 cross-talk	(0-99)
66	0xxx xxxx	Trigger 12 noise floor	(0-99)
67	0ddd dddd	Trigger 12 decay	(0-99)
68	0xxx xxxx	Checksum	(0-127)
69	1111 0111	EOX	

Messages 32 thru 52 / Single Drumset Only

These messages contain the same Drumset data structures as the Edit Buffer message and are identical, with the exception of the opcode byte. When a D4 receives a complete Single Drumset message it will automatically "Store" the data in one of the 21 memory locations (as specified in the opcode) replacing the existing Drumset data for that slot. Its important to note that this new Drumset data does not effect the edit buffer. For a detailed listing of the Drumset data structure see the description under Message 1 / Edit Buffer.